CIBTech Journal of Surgery ISSN: 2319-3875 (Online)
An Online International Journal Available at http://www.cibtech.org/cjs.htm
2013 Vol. 2 (1) January-April, pp.1-5/ Renukananda et al.
Research Article

CAN UNNECESSARY TONSILLECTOMIES BE AVOIDED? – A RELOOK!!

G.S. Renukananda, U.P. Santosh, Shinoy Ansari and *Nitha Mary George
Department of Otorhinolaryngology, J.J.M. Medical College, Davangere Karnataka-577004
**Author for Correspondence*

ABSTRACT
The present study is undertaken on 100 tonsillectomy cases to determine the accuracy of surface swab culture in predicting the tonsillar core organism. The study indicates that the surface swab culture do not reliably reflect the presence of pathogens in the tonsil core. It concludes that routine culture of the throat by surface throat swab is neither a reliable nor a valid test in the diagnosis of bacterial flora in chronic tonsillitis.

***Key Words**: Chronic Tonsillitis, Tonsillectomy, Surface Culture, Core Pathogens, Antibiotic Resistance*

INTRODUCTION
Chronic tonsillitis is the most common disease in the throat occurring predominantly in the younger age group. It is due to chronic inflammation within the tonsils due to inappropriate or failed antibiotic therapy or in case of insufficient penetration of antibiotics into the core. The diagnosis of chronic tonsillitis is mainly by history and clinical examination. Effective treatment of chronic tonsillitis depends on knowledge of the infecting organism. Tonsillar disease may stem from the bacteria within the substance of the tonsil, rather than the bacteria identified on the surface. Superficial tonsil swabs are often used as a guide in the selection of this therapy in tonsillitis. However several studies indicate a marked discrepancy in the surface and core pathogen flora. Thus the practice of swabbing the tonsillar surface as a culture specimen for determination of the organism responsible for the tonsillar pathology can be misleading. If the surface culture was representative of the bacteriology of the core, then rational treatment of the tonsillitis could have been based on the organisms cultured by surface swabs.
Antimicrobial treatment often fails to eradicate the pathogens and prevent recurrence of the tonsillar tissue. Failure to eradicate pathogenic organisms in the core could be either due to inappropriate antimicrobial therapy or inadequate penetration in the core which paves the way to either persistence of core infection or re-inoculation of initially sterilized surface.
Recurrent acute adenotonsillitis and tonsillitis are common disorders accounting for substantial percentage of visits to the general practitioner and its financial expenditure. Despite the ubiquity of the problem, the underlying pathogens are poorly understood. Treatment usually involves prescription of an antibiotic based on a superficial tonsillar swab, with surgical intervention in the event of failed medical treatment. Recurrent tonsillitis is the commonest indication for tonsillectomy.
The present study aims at finding the common bacteria on the tonsil surface and core, their sensitivity patterns; as well as to find out whether surface swab culture could be used as a test for predicting the core organisms.

MATERIALS AND METHODS
This is a time bound cross sectional study done on 100 consecutively operated tonsillectomy cases at Chigateri General Hospital, Bapuji Hospital and teaching hospitals attached to J.J.M. Medical College, Davangere over a period of two years from September 2005 to September 2007.
The patient's ages ranged from 4-45 years. 46 cases were males and 54 were females. The duration of symptoms ranged from 6 to 48 months. The most common indication for tonsillectomy was recurrent tonsillitis (in 72 cases); whereas obstruction caused by enlarged tonsils and adenoids were indications in 20 cases. In 8 cases, recurrent tonsillitis along with obstruction was the indication.

A proforma was filled for each patient documenting age, sex, address and clinical information, including chief complaints and duration of symptoms. Following this a detailed otorhinolaryngological and general physical examination was done. Investigations including Hb %, bleeding time, clotting time, HIV, HBsAg, and routine urine examination were done for all patients prior to surgery.

After the patient was intubated, a tonsillar surface swab was obtained by rotating a sterile cotton wool swab over the right tonsil without touching other parts of oropharynx. Following this the tonsillectomy procedure was carried out in the same side. The right tonsillar tissue removed was dipped in povidone iodine solution for 30 to 45 seconds, after which it was rinsed with sterile saline solution, and sectioned into two pieces under strict aseptic conditions. The core of the tonsil was then biopsied, and this tissue was collected in a sterile glass container and sent immediately to the microbiology laboratory for culture and sensitivity testing.

In the Microbiology Department, a thin smear was made on a clean glass slide and was fixed with 95% methanol by pouring one or two drops on the smear and allowed to act for a minimum of 2 minutes or until the methanol dried on the smear. Gram staining was done for the smears so made and examined under oil immersion objective to note the various morphological types of bacteria, their number, gram reaction, presence or absence of inflammatory cells and also to note the numbers of squamous epithelial cells in the sample.

Specimens were cultured on blood agar, nutrient agar and MacConkey agar plates. All plates were incubated aerobically at 37°C and evaluated at 24 hours, 48 hours and 72 hours and the plates were discarded if there was no growth. Colony identification was accomplished using standard technique. Antimicrobial susceptibility of the bacterial isolates to commonly used antibiotics was done by Kirby-Bauer disc diffusion method.

Statistical analysis of results was carried out using SPSS (statistical package for social science) version 13. The following were done: Chi-square test, kappa (Agreement test), sensitivity and specificity. Level of significance is considered <0.05 for chi-square test and >0.4 for kappa.

RESULTS

Majority of the patients were in the age group of 11-20 years (50%). Overall there was a female predominance.

Table 1: Distribution of cases according to indication for tonsillectomy/adenotonsillectomy

Indications	No. of cases
Obstructive indication	20
Recurrent tonsillitis	72
Obstructive indication and recurrent tonsillitis	8

Table 2: Pathogenic organisms isolated from all the cases

Organism	Number
S. Aureus	45 (34.09%)
H.Influenzae	24 (18.18%)
GABHS	23 (17.24%)
Klebsiella	14 (10.61%)
B. Catarrhalis	8 (6.06%)
Pseudomonas	5 (3.79%)
S. Epidermidis	10 (7.58%)
Enterococci	3 (2.27%)
Total	**132**

The tonsillar surface culture is compared with tonsillar core organisms. A total number of 132 pathogenic organisms were isolated from 100 cases. More than 1 pathogen was isolated in 45 cases. The bacteria isolated according to prevalence in decreasing order of frequency were *Staphylococcus aureus (S.Aureus)* (34.09%) followed by *Hemophilus influenza (H.Influenzae)* (18.18%) and *Group A β-hemolytic streptococcus (GABHS)* (2.27%). Out of 132 pathogens isolated 81 (61.36%) were gram positive and 51 (38.64%) were gram negative.

The most predominant pathogen isolated was *S.Aureus* (28 cases in surface and 34 cases in core) followed by *H.Influenza* (12 in surface and 14 in core) and GABHS (10 in surface and 12 in core). Normal flora was isolated in 23 cases in surface and 23 cases in core.

Table -4: Distribution of predominant pathogens across surface and core

	Surface	Core	Surface only	Surface + Core	Core only	Total
S. Aureus	28	34	8	20	14	42
H. Influenza	12	14	6	6	8	20
GABHS	10	12	10	0	12	22
Klebsiella	9	6	7	2	4	13
B.Catarrhalis	5	5	3	2	3	8
Pseudomonas	2	3	2	0	3	5
S.Epidermidis	8	3	7	1	2	10
Enterococci	3	0	3	0	0	3
Total						**123**

Table 5: Whether surface is indicative of core or not

Surface	Core	No.of cases
Pathogen	Pathogen (same)	31
Pathogen	Pathogen (different)	40
Normal flora	Pathogen	6
Pathogen	Normal flora	6
Normal flora	Normal flora	17

Table 6: Sensitivity and specificity measures

		Core organism		
		Present	**Absent**	**Total**
Surface organism	Present	48 (a)	52 (b)	100 (a+b)
	Absent	51 (c)	49 (d)	100 (c+d)
	Total	99 (a+c)	101 (b+d)	200

The following were calculated using above table:
Sensitivity = 48.5%
Specificity = 48.5%
Positive predictive value = 48%
Negative predictive value = 49%
Overall accuracy = 48.5%.
$X^2 = 0.18$

p=0.67. (Level of significance <0.05) showing that there is no statistically significant correlation between surface and core cultures. Kappa (measure of agreement) = 0.04 (significant if >0.4); showing no agreement of results of tonsil surface swab and core tissue cultures.

Table 7: Antibiotic sensitivity patterns of predominant organisms

Antibiotics	S. Areus (n=42)	S.Epider-midis (n=10)	Klebsiella (n=13)	Pseudo-monas (n=5)	Entero-cocci (n=3)	H. Influenzae (n=20)	GABHS (n=22)	B. Catarrhalis (n=8)
Penicillin	3 (7.14%)	4 (40%)	0	0	3 (100%)	0	20 (90.90%)	8 (100%)
Ampicillin	4 (9.52%)	4 (40%)	1 (7.69%)	0	3 (100%)	0	21 (95.45%)	8 (100%)
Cotrimoxazole	12 (28.57%)	2 (20%)	3 (23.07%)	0	2 (66.66%)	14 (70%)	17 (77.27%)	8 (100%)
Erythromycin	9 (21.42%)	7 (70%)	2 (15.38%)	0	3 (100%)	15 (75%)	22 (100%)	8 (100%)
Tetracycline	9 (21.42%)	1 (10%)	2 (15.38%)	0	3 (100%)	4 (20%)	22 (100%)	8 (100%)
Gentamycin	31 (73.80%)	10 (100%)	12 (92.30%)	3 (60%)	3 (100%)	20 (100%)	22 (100%)	8 (100%)
Ciprofloxacin	42 (100%)	10 (100%)	13 (100%)	2 (40%)	2 (66.66%)	20 (100%)	22 (100%)	8 (100%)
Ofloxacin	42 (100%)	10 (100%)	13 (100%)	2 (40%)	2 (66.66%)	20 (100%)	22 (100%)	8 (100%)
Cefotaxime	30 (71.42%)	10 (100%)	13 (100%)	1 (20%)	3 (100%)	20 (100%)	22 (100%)	8 (100%)
Amikacin	40 (95.23%)	10 (100%)	13 (100%)	4 (80%)	2 (66.66%)	20 (100%)	22 (100%)	8 (100%)

Table -8: The mean sensitivity of all pathogens to antibiotics

S.Aureus	Staph Epidermidis	Klebsiella	Pseudo-monas	Entero-cocci	H. influ-enzae	GABHS	B. cattarr-halis
Common antibiotics							
17.61%	36%	12.30%	0	93.33%)	33%	92.72%	100%
Higher antibiotics							
88.09%	100%	98.46%	48%	79.99%	100%	100%	100%

DISCUSSION

In the present study the bacteria isolated according to prevalence in decreasing order of frequency were *S.Aureus* (34.09%), followed by *H.Influenza* (18.18%) and GABHS (2.27%). In Gul et al., (2007) series *S.Aureus* was found in 33.6% followed by GABHS in 31.1% and *H.Influenza* in 14.2%. In the study by Abdulrahman AS *et al.,* (2004) S. Aureus was the predominant isolate (77.7%), followed by *GABHS* (18.5%) and *E.coli* (3.7%).

In 31 cases of the present study, the same pathogen was isolated from surface as well as core. In majority of cases (40), different pathogens were isolated from surface and core. In 6 cases when normal flora was isolated from surface, a pathogen was isolated in core. In 6 cases, when pathogen was isolated from surface, the core organism was found to be normal flora. In 17 cases, normal flora was isolated from both surface as well as core. The group with the same pathogen on the surface and core were almost equal in Surrow *et al.,* (1989) (33%), Kurien *et al.,* (2000) (30%) and in the present study (31%). The group with different pathogens on the surface and core were 31% in the present study, 31% with Gul M. et al[1], 15% with Kurien *et al.,* (2000) and 5.1% with Surrow *et al.,* (1989).

Majority of pathogens (51.88%) were resistant to common antibiotics (Penicillin, Ampicillin, Cotrimoxazole, Erythromycin and Tetracycline). *S.Aureus* (17.61%), *Klebsiella* (12.30%), *S.Epidermis* (36%) and *H.Influenza* (33%) showed the least sensitivity whereas higher sensitivity was shown by *Enterococci* (93.33%), GABHS (92.27%) and *Branhamella Catarrhalis* (100%) to common antibiotics. 100% sensitivity was shown by *S.Epidermis, H.Influenza, GABHS and Branhamella Catarrha*lis followed by *Klebsiella*(98.46%), *S.Aureus*(88.09%), *Enterococ*ci (79.99%) to higher antibiotics (Gentamycin, Ciprofloxacin, Ofloxacin, Cefotaxime and Amikacin).

The statistical conclusions made were similar to previous studies and proved that surface culture was not a valid indicator of the organisms present in tonsillar core.

Conclusion

This study is evidence that routine culture of the throat by surface throat swab is inadequate in the diagnosis of bacterial flora in chronic tonsillitis. Hence, the consideration of a more reliable and valid diagnostic test appears to be necessary. In patients with chronic tonsillitis, the role of fine needle aspiration of tonsillar core under local anaesthesia for the identification of bacterial flora is a possibility for consideration and further evaluation by which appropriate use of antibiotics following culture and sensitivity could avoid unnecessary tonsillitis in future.

ACKNOWLEDGEMENT

I would like to express my deep gratitude to Dr G S Renukananda for preparing me for this task and guiding me with his professional expertise, Dr Santosh UP for his sincere advice and constant supervision. I am highly indebted to Dr Shinoy Ansari for helping me prepare this article.

REFERENCES

Abdulrahman AS, Kholeif LA, El-Beltagy YM and Eldesouky AA (2004). Bacteriology of tonsil surface and core in children with chronic tonsillitis and incidence of bacteremia during tonsillectomy. *Egyptian Journal of Medical Laboratory Sciences* Available at: http://www.ems.org.eg/elmgala_elalmia/ESIC_sep_04/data/2.pdf [Accessed 15 July 2007].

Gul M, Okur E, Ciragil P, Yildirim I, Aral M and Kilic MA (2007). The comparison of tonsillar surface and core cultures in recurrent tonsillitis. *American Journal of Otolaryngology - Head and Neck Medicine and Surgery* **28** 173-176.

Kurien M, Stanis A, Job A, Brahmadathan and Thomas K (2000). Throat swab in chronic tonsillitis: how reliable and valid is it. *Singapore Medical Journal* **41**(7) 324-326.

Surrow JB, Handler SD, Telian SA, Fleisher GR and Baranak CC (1989). Bacteriology of tonsil surface and core in children. *Laryngoscope* **99** 261-266.